Homeland Security
Science and Technology

Agenda

❑ Introduction & Welcome	Dr. Gerstein	9:00 – 9:05
❑ CBP Issues, Priorities & Concerns	TBD	9:05 – 10:45
❑ Break	All	10:45 – 11:00
❑ S&T Areas of Support to CBP (Includes working lunch)	TBD	11:00 – 2:00
❑ Public Comment	TBD	2:00 – 2:15
❑ HSSTAC Discussions & Questions	HSSTAC (+)	2:15 – 3:30
❑ HSSTAC Outbrief	HSSTAC (+)	3:30 – 4:30

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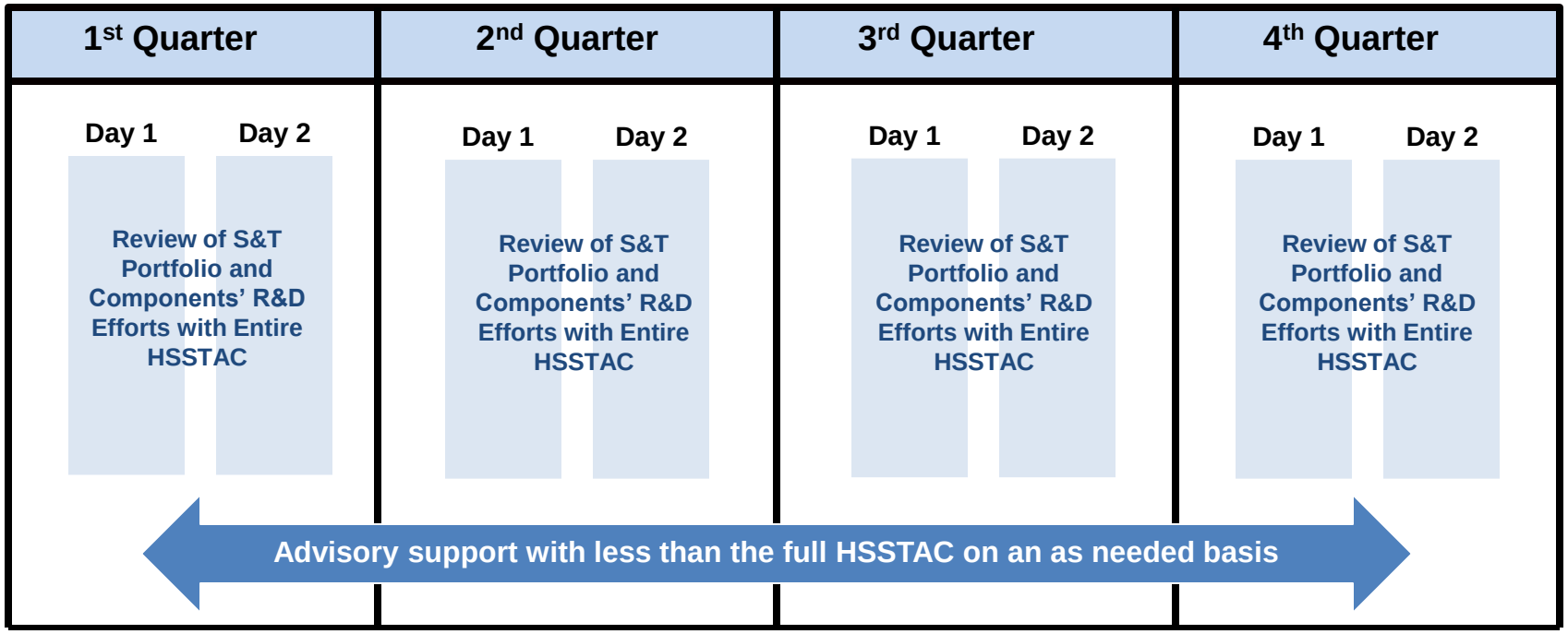
HSSTAC – Way Forward



- Capitalize on the broad capabilities of HSSTAC members to provide thoughts on key R&D efforts in S&T and Components
- Convene smaller group for more narrowly focused issues (e.g., TSA advisory committee)
- Revitalize the HSSTAC to take maximum advantage of senior, broad gauge leaders insights …

Department of Homeland Security
Science & Technology

HSSTAC Day 2 -- CBP

Dr. Daniel Gerstein
Under Secretary (Acting)
Science & Technology Directorate

December 5, 2013

Homeland Security

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Organization of DHS Science & Technology (S&T) Aligned with Mission

Under Secretary
Deputy Under Secretary

⟷ **TSA, CBP, CIS, ICE, USSS, FEMA, USCG, NPPD, DNDO, OHA, First Responders**

First Responders Group (FRG)

- Interoperability & Compatibility
- Technology Clearinghouse
- National Urban Security Technology Lab (NUSTL)

Homeland Security Advanced Research Projects Agency (HSARPA)

- Borders & Maritime
- Chemical/Biological
- Cyber Security
- Explosives
- Resilient Systems

Acquisition Support & Operations Analysis (ASOA)

- Research & Development Analysis & Assessment
  - Transportation Security Lab (TSL)
- Federally Funded Research & Development Centers Program Management Office
- Standards
- Test & Evaluation

Research & Development Partnerships (RDP)

- Interagency
- International
- National Labs
  - Plum Island (PIADC)
  - National Biodefense Analysis & Countermeasures Center (NBACC)
  - Chemical Security Analysis Center (CSAC)
  - National Bio & Agro-Defense Facility (NBAF)
- Public-Private Partnerships
- University Programs

S&T's Value Added Proposition …

- ***Operationally focused*** **… focused technology options & operational process enhancements**
- ***Innovative*** **… develop innovative, systems-based solutions to complex homeland security problems**
- ***Building partnerships*** **… technical depth and reach to leverage technology solutions from federal, state, local and tribal governments, universities, and the private sector - across the US and internationally**

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Operational Focus

- Rio Grande Valley
- Secure Transit Corridor
- Rapid DNA
- Mobile Biometrics




- Multi-Band Radio
- Virtual USA
- Next Generation PPE
- FiRST




CBP … CIS … ICE | State/Local … FEMA

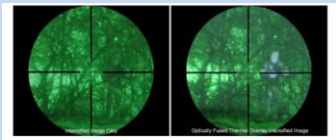
TSA … FPS | USSS … FBI

- STORE
- Cyber Forensics
- National Bioforensics Analysis Center (NBFAC)

- Explosives Detection
- Checked Baggage
- Future Checkpoint

Cross Cutting Areas

- Big Data
- DoD Tech Transfer
- SAFETY Act
- International programs
- Joint Interagency Exercises




Systems Analysis | Program Management | Team Effort

Operational Need | Appropriate Resources | Leadership Focus

Leads to a Successful Program

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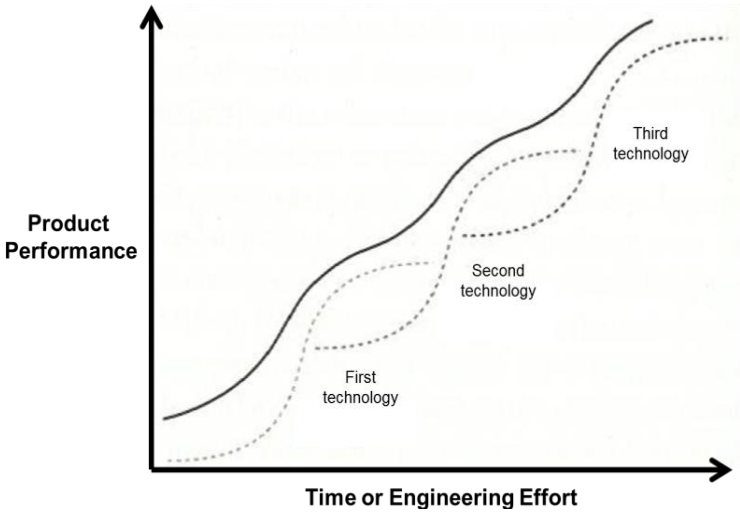
Innovation

Henry Ford … Faster Horse vs. Car

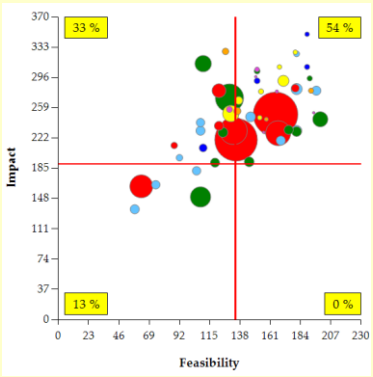
Nature of Innovation: Both sides get to innovate … potential for individuals with state-like capabilities

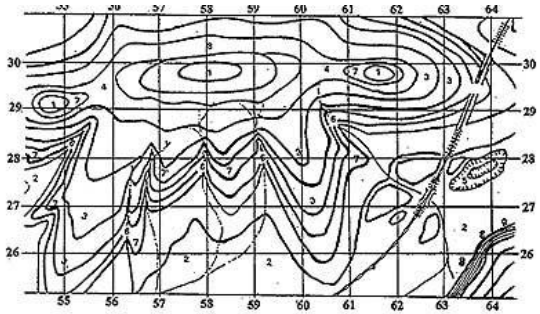
S&T Game Changers

- Advanced Manufacturing including 3D printing, Nanotechnology, Micromanufacturing
- Information and Communication Technology (ICT) and Data Proliferation
- Biological Sciences
- Weapons Technology and Robotics
- Energy
- Scientifically Informed, Technologically Based Decisions … then modeling, simulation

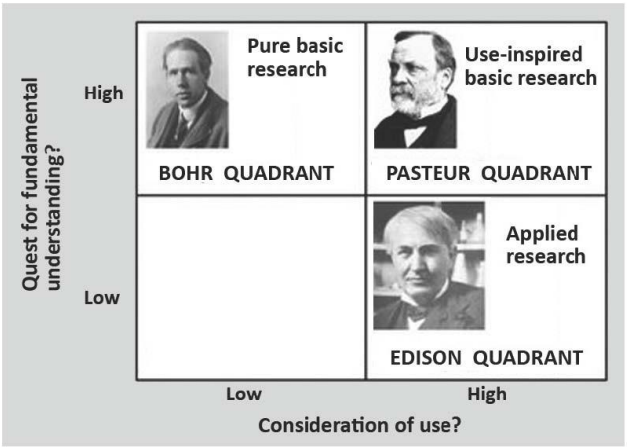


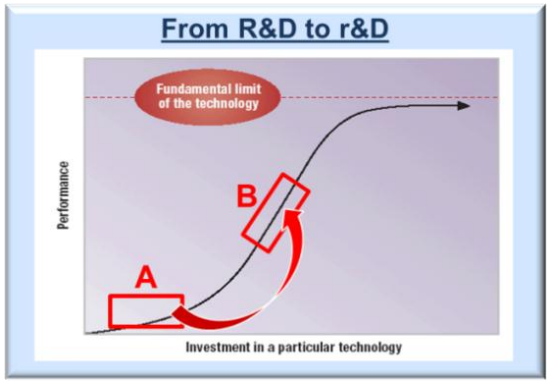
Where should S&T be with investments?





Looking out 2 terrain features …





Deliverables

- Technological Capabilities & Knowledge Products
- Acquisition Support & Operational Analysis
- Process Enhancements & Gain Efficiencies
- Understanding of Homeland Security Risks & Opportunities

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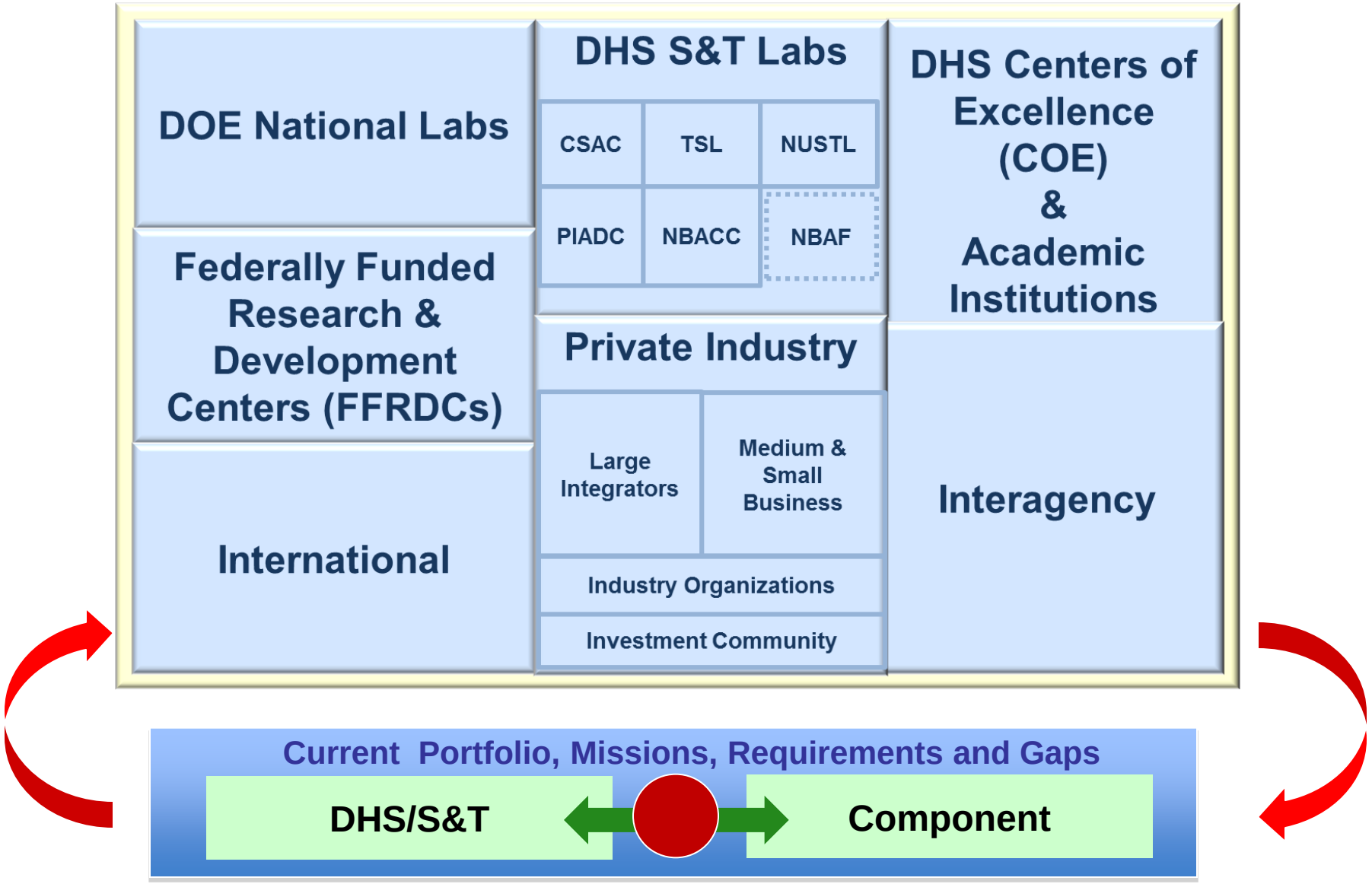
S&T Partnerships



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S&T Support to CBP

- Systems Analysis and Process Enhancement
- Proof-of-Concept Studies and other Knowledge Products
- Developmental Testing
- Operational Testing
- New Technology Development
- Commercially-off-the-shelf Technology Assessments
- Prototype Development
- Leveraging, form-fitting, and integrating DoD and other federal government technologies and efforts
- Performance Specifications and Industry Standards
- Acquisition Documentation Support
- Procurement Contract Vehicles






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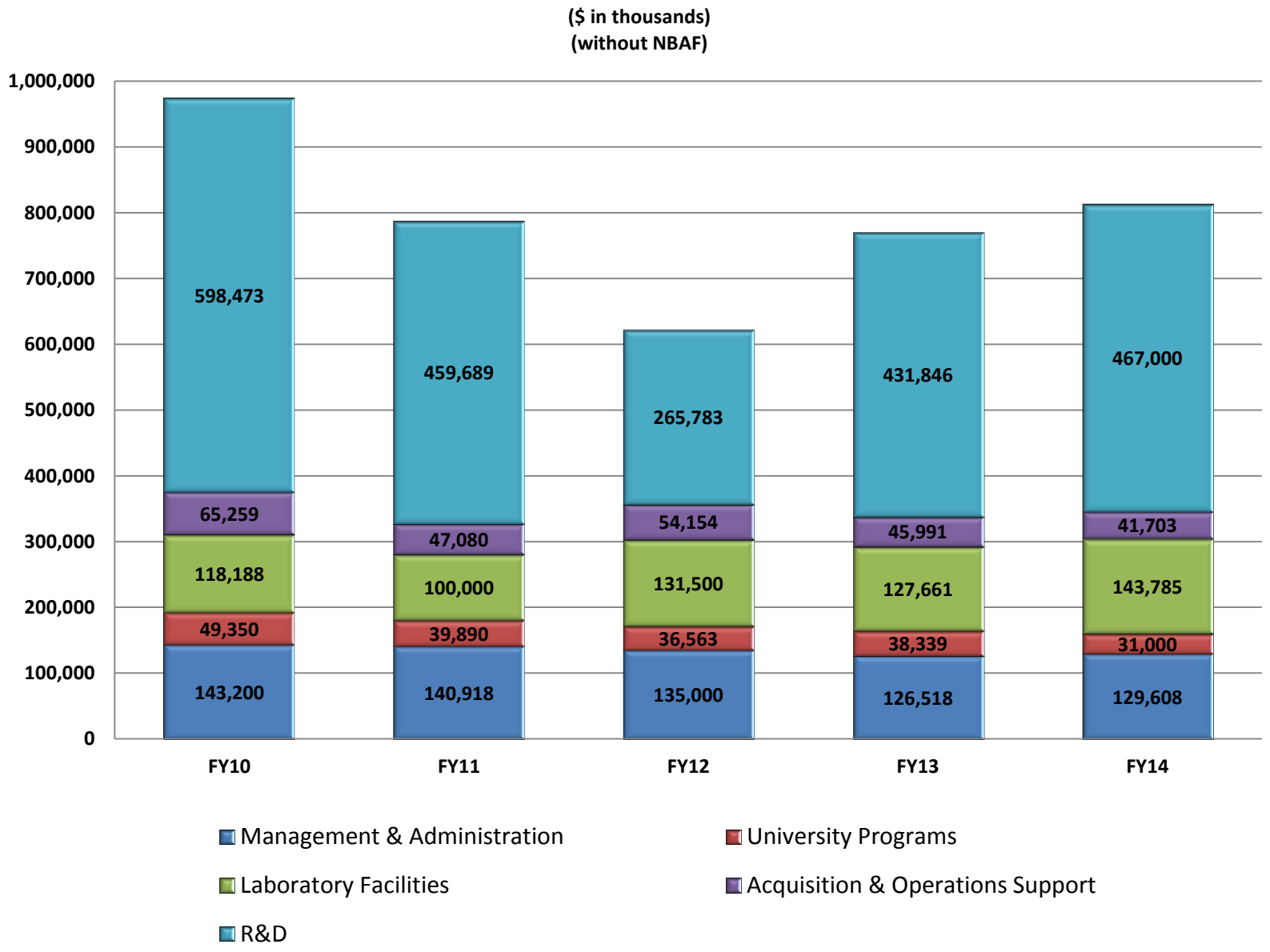
S&T Funding



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CBP Financial Support for S&T Work/FFRDCs

By CBP to Support Programmatic Work

	FY13	FY12	FY11	FY10
CBP	$1,200,000	$17,236,893	$22,059,820	$4,000,000

By CBP for Work Done by HSSAI or SEDI

	FY13	FY12	FY11	FY10
CBP	$12,032,530	$8,951,951	$3,970,243	$9,280,869

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S&T Projects Supporting CBP

Description	FY 2013	FY 2014	Other DHS Components/Partners
Cooperative Biometrics Project	4,503,000	5,000,000	ICE, NPPD-FPS
Biometric Database Interoperability Project	1,467,125	1,200,000	ICE, DOD, FBI
Currency Detection Project	2,000,000		ICE, TSA
Ground-Based Technologies Project	4,000,000	4,000,000	
Maritime Cargo Security Pilot Project	1,311,883	1,500,000	
Maritime Secure Hybrid Composite Container Build/Pilot Project		1,000,000	
Mobile Biometrics System Project		2,061,000	
Multi-Application Multiplex Technology Platform Project	10,030,371	4,000,000	
Noncooperative Biometrics Project	1,350,000	3,500,000	ICE
Passive Methods for Precision Behavioral Screening Project	375,000	2,200,000	TSA/U.S. Secret Service (USSS)
Polymerase Chain Reaction Collection Efficiency Project		1,800,000	
Rapid Response Prototyping Team Project	1,000,000	1,000,000	
Risk Prediction Project.	2,500,000	3,430,000	TSA
Small Dark Aircraft Project	2,500,000	1,900,000	
Small Dark Vessels Project	3,000,000	2,000,000	USCG/ICE/Navy
Tunnel Activity Monitoring Project	1,260,000	1,000,000	ICE
Tunnel Age Project		1,000,000	ICE
Tunnel Detection Project	1,750,000	2,900,000	ICE
Rapid DNA Project.	2,090,000	2,300,000	CIS
Vehicle and Cargo Inspection System (VACIS) Upgrade Project	900,000		
Coastal Surveillance Pilot Project		2,000,000	USCG
Port and Coastal Surveillance Improvement Project	3,500,000	2,000,000	USCG
Total CBP	**55,291,609**	**57,871,005**	

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Apex-Secure Transit Corridors (STC)

- **Truck and rail security device monitoring unauthorized door openings and anomalies as well as encrypted in-transit tracking capability**
  - **Two-year project analyzing supply chain corridors from Mexico and Canada**
  - **Goal is to increase overall conveyance security and improve the flow of commerce through U.S. Ports of Entry**
  - **$9.5M invested by S&T since 2011**
- **Major Accomplishments:**
  - **Developed a Supply Chain Data Management system in April 2012 and deployed it in June 2012 using truck supply chain routes from Canada with General Motors and Honda Manufacturing; and Rail Supply Chain Runs from Mexico with Ford Motor Company in November 2012**
- **Next Steps:**
  - **Develop internationally accepted security device standard with a positive Return on Investment for Industry and Government**
  - **Develop an implementation plan for integration of Apex-STC technology capabilities within CBP's baseline systems (Big Data)**

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Department of Defense Equipment

- **Congress is promoting DHS/DoD interagency cooperation for reutilization of excess DoD equipment for homeland security purposes**
  - **The existing transfer processes require streamlining, better efficiency, and clearer cost avoidance strategies**
- **Major Accomplishments:**
  - **More than 3000 DoD items currently at Sierra Army Depot have been identified and inventoried by CBP as having potential utility**
  - **A highly successful CBP Operational Utilization Evaluation (OUE) on excess aerostats/re-locatable towers was conducted in the Rio Grande Valley in August 2012**
- **Next Steps:**
  - **Define the root cause for the delays and impediments to excess DoD equipment transfers to CBP/DHS**
  - **Direct the DoD DHS Capability Development Working Group (CDWG)Logistics Sub Group to recommend joint solutions**
  - **Secure change to the DoDI on disposition of excess equipment**

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Unmanned Aerial Vehicles (UAVs)

- **Overview:**
  - Developing airborne sensor capabilities for situational awareness and airborne detection, identification, and classification
  - Identifying and quantifying current capability gaps and sensor requirements
  - Conducting flight T&E in operational environments and developing CONOPs
  - S&T funding:
    - FY12 - $5M
    - FY13 - $7M (S&T funding)
- **Developed/tested on-board sense-and-avoid radar for CBP's MQ-9/Predator**
- **Conducted two Wide Area Airborne Surveillance demonstrations for CBP in FY12**
- **Next Steps:**
  - T&E of prototype sense-and-avoid radar
  - T&E of additional Wide Area Airborne Surveillance sensors/systems
  - Test first vendor supplied SUAS (part of RAPS project) in Dec 2012
    - Plan to perform one test/month thru remainder of FY13 (budget dependent)

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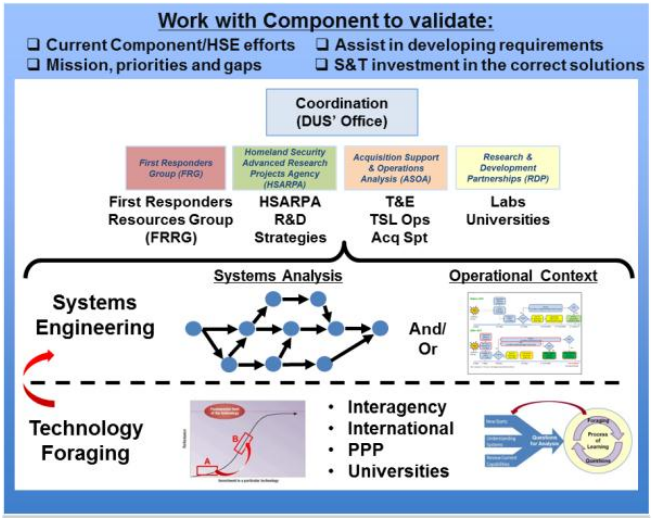
VADER

- **Overview:**
  - Detects and tracks moving vehicles and dismounts over large areas and can detect disturbances due to human activity via coherent change detection
  - VADER tested in July/August 2011 on a CBP aircraft
  - S&T funding - $167.5K

- **Initial testing in Jul/Aug 2011 demonstrated the operational and intelligence utility of VADER on an CBP/OAM Predator B**
- **CBP/OAM & S&T partnered to fund long duration flight testing Operational flights commenced in March 2012**
  - To date: 483.8 hours flown; 838 apprehensions; 7,191 pounds of narcotics seized
- **Next Steps:**
  - CBP to determine transition path/alignment with acquisition program
  - Discuss with CBP/OAM the possibility of developing, jointly, a comparative assessment of available airborne wide-area sensors

Science & Technology's Resource Allocation Strategy (STRAS)



Signature Document

Annexes

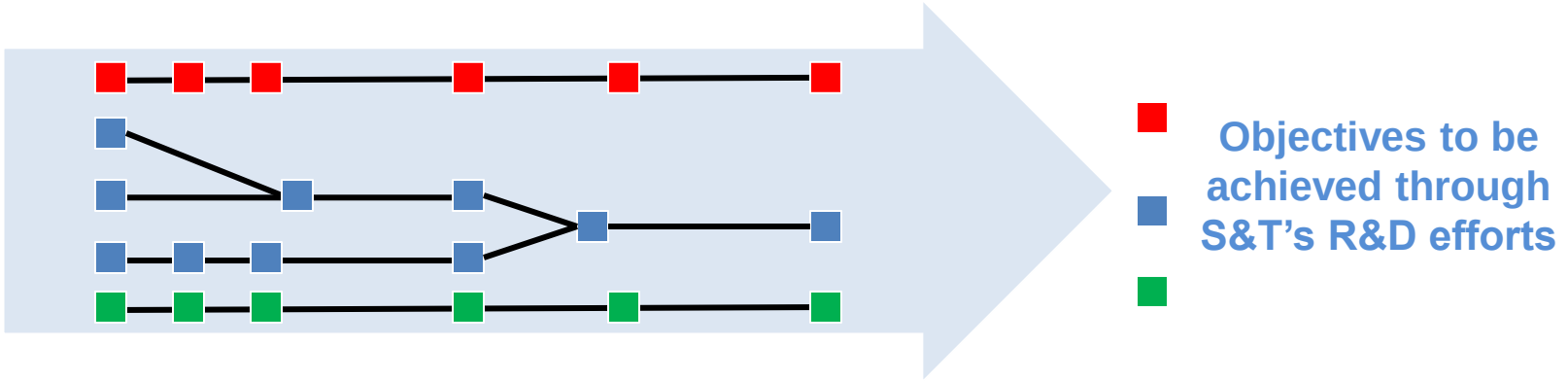
- A — Previous Year Support & Funding
- B — R&D Strategies
- C — First Responders Initiatives
- D — Systems Analysis Support
- E — T&E Support
- F — National Laboratory Support
- G — COE Interface
- H — Interagency Coordination
- I — Technology Foraging
- J — Public-Private
- K — Others?

Update:

- ❑ Will use HSSTAC on 4-5 December and FEMA meeting on 16 December to prototype
- ❑ All groups are developing their presentations

STRAS Also Includes (Internal Perspective) …

Technology Roadmaps



- ❑ **Agricultural Screening Tools: Will provide tools needed to rapidly: (1) detect and respond to Foreign Animal Disease (FAD) outbreak; (2) cargo inspections at ports of entry**
- ❑ **Outcomes/payoffs**
  - **Trusted tools and assays:**
    - **For use during outbreak to handle anticipated sample surge**
    - **Reduced sample transport logistics**
    - **Swifter answers to allow continuity of business for industries**
    - **Reduced impact to export and quicker return to trade status**
    - **Eventual adoption into pre-event surveillance activities**
- ❑ **Transition**
  - **USDA APHIS National Veterinary Services Laboratory**
    - ➢ **Dossier via National Animal Health Laboratory Network Methods Technical Working Group (NAHLN MTWG)**
  - **Livestock Industry's (Dairy, Pork)**

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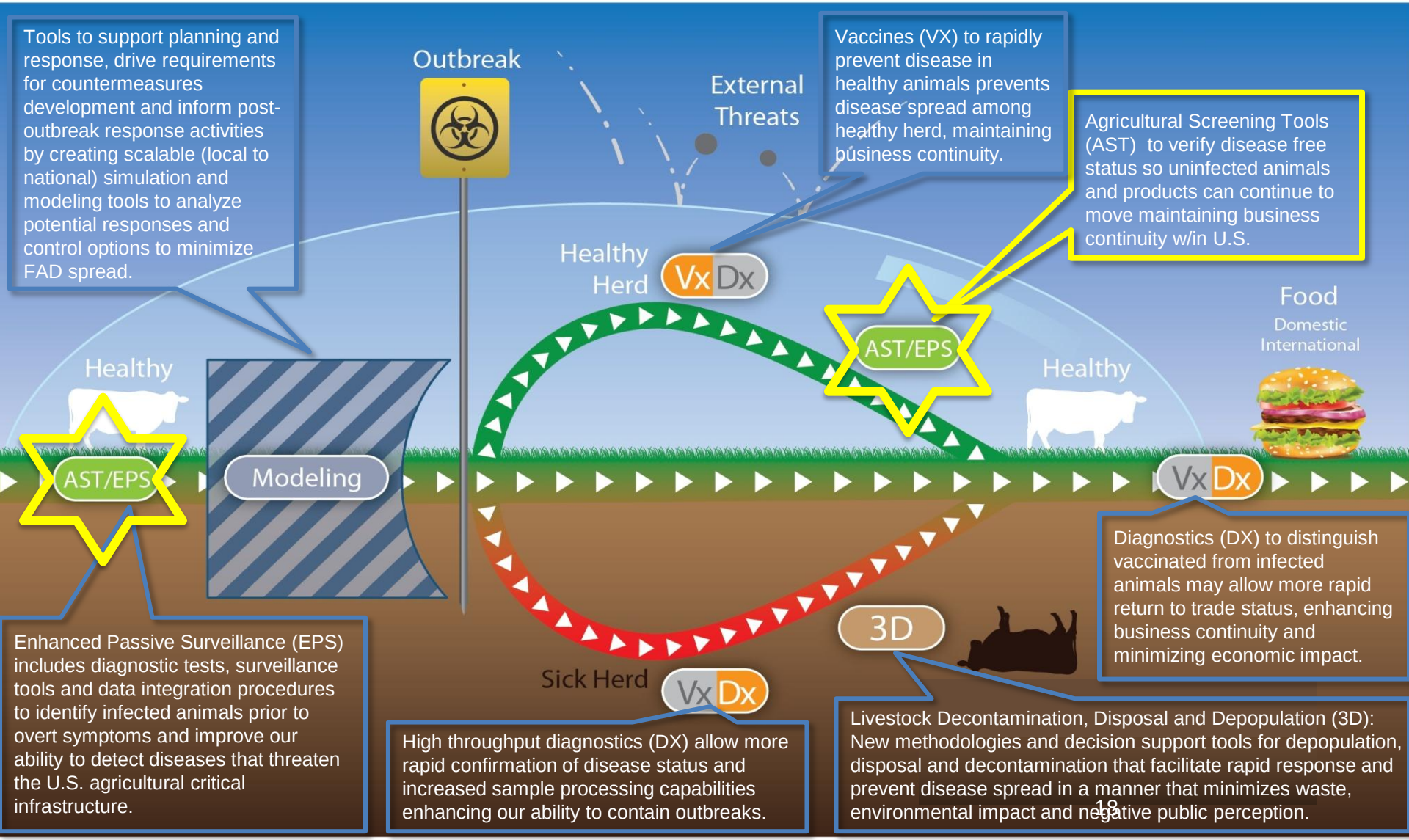
Agricultural Screening Tools Roadmap



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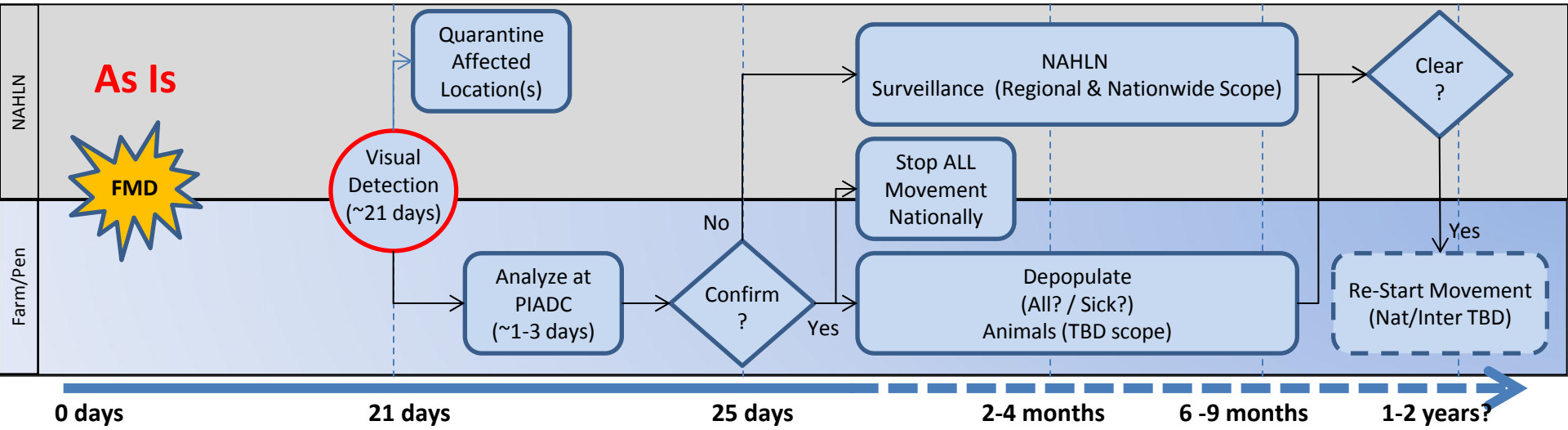
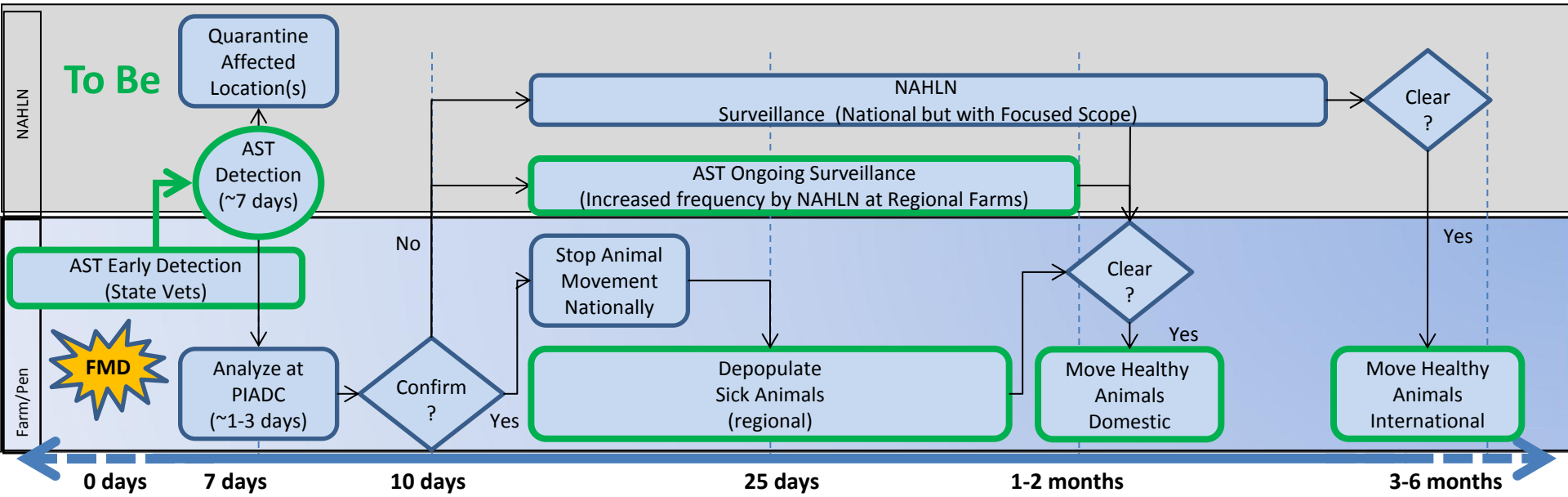
Operational Context Chart (As Is -- To Be)





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HSSTAC -- HSARPA & CBP

Dr. Adam Cox
Director, HSARPA
Science & Technology Directorate

December 6, 2013

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CBP Mission Space Supported by HSARPA

- Provide technical knowledge and capability that address DHS operational needs in border, maritime, and cargo security
- Operational settings:
  - Areas between Ports of Entry (POEs)
  - At the POEs (includes cargo and conveyance security, agriculture and trade screening, and passenger admissibility)
- Domains:
  - Air
  - Ground
  - Underground
  - Water/Underwater

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HSARPA Support to CBP

- Proof-of-Concept Studies and other Knowledge Products
- Laboratory Demonstrations
- Operational Demonstrations
- New Technology Development
- Commercially-off-the-shelf Technology Assessments
- Prototype Development
- Leveraging, form-fitting, and integrating DoD and other federal government technologies and efforts
- Performance Specifications and Industry Standards
- Acquisition Documentation Support
- Procurement Contract Vehicles

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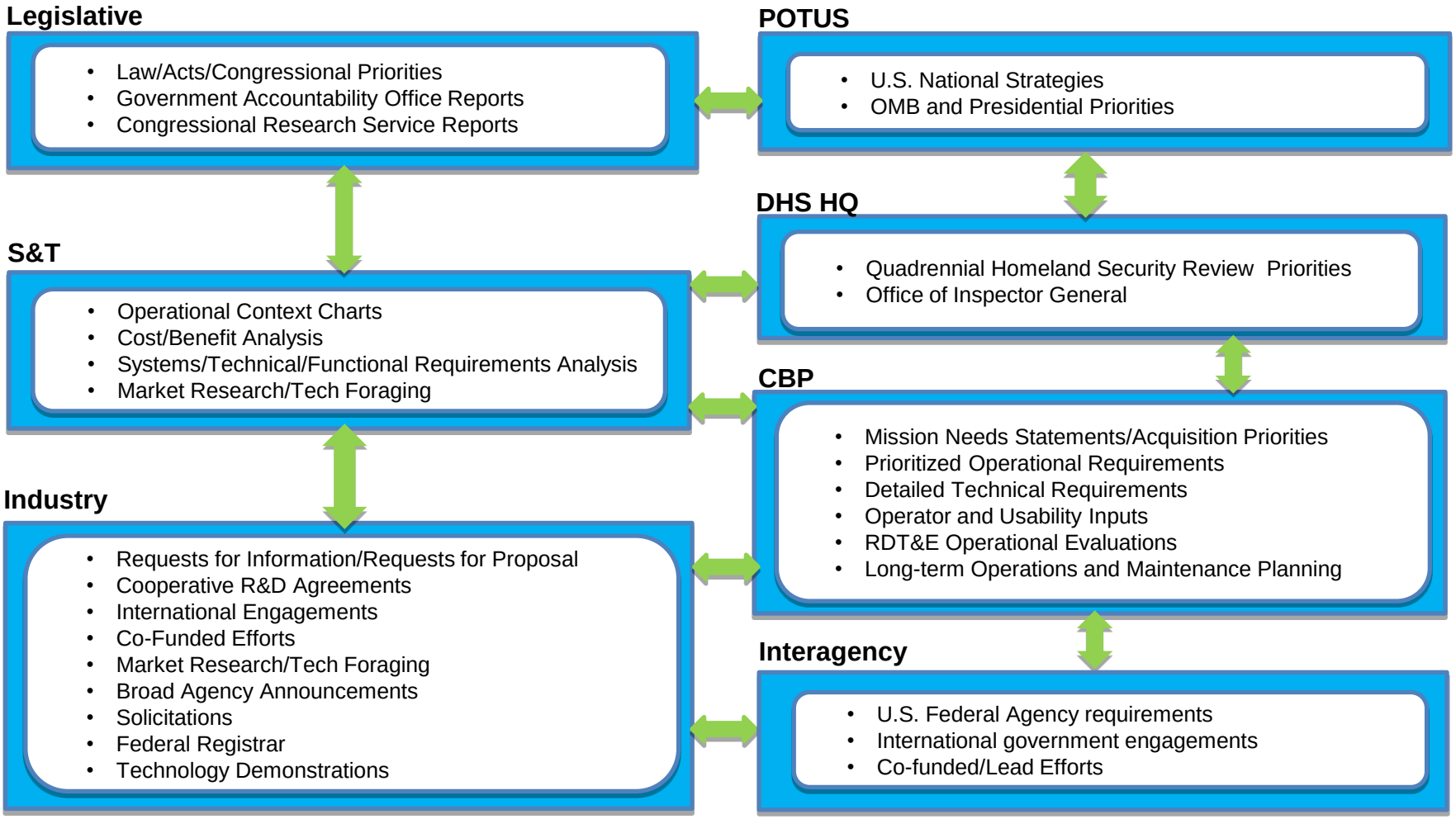
Overall Factors and Considerations for CBP Investments



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HSARPA Project Portfolio for CBP

Land Border Security

- Air Based Technologies
- Ground Based Technologies
- Small Dark Aircraft
- Tunnel Activity Monitoring
- Tunnel Detection
- Rapid Response Prototyping
- Bulk Currency Detection
- SQUID
- Border Agriculture Screening

Maritime Border Security

- Coastal Surveillance System

Biometrics

- Tactical Awareness Biometric Build

Cargo Security

- Maritime Cargo Security Pilot
- CES/In Bond Cargo Pilot
- Composite Container
- Mid-Energy Scanning System Upgrade
- Targeting Screening Enhancement
- Risk Prediction Screening (air passenger and cargo)

Cargo Validation

- Counterfeit Detection
- Pollen Forensics

Cyber Security

- Cyber Forensics

Apex

- Air Entry/Exit Re-Engineering

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Air-Based Technologies

Project Descriptions

Need: This umbrella project has several activities aimed at creating technology knowledge and/or prototypes to address operational capability gaps.

Robotic Aircraft for Public Safety (RAPS): Evaluate overall performance and utility of Small Unmanned Aircraft Systems (SUAS) and onboard sensors in realistic operational scenarios and environments. RAMPS is maritime version of RAPS. **ROI:** SUAS has high tactical value such as higher operational availability, lower time-to-target and lower cost comparing to large UAS or piloted aircraft (Ex: Predator: $18M acq. & $3K/flight hr vs. SUAS: $30K acq. & $50/flight hr). RAPS enables direct comparison of various SUAS in relevant ops hence saving T&E cost for thousands of Fed/State organizations in charge of public safety.

Airborne Sensors T&E: Conduct operational assessments of airborne sensors (such as wide-area imaging systems/radars) in countering border security threats. **ROI:** Large increase in # apprehensions. Example: Aerostat Wide Area Airborne Surveillance System (WAASS) during 1 week of operational testing in Tucson resulted in over 120 assisted apprehensions.

CBP Requirement:: OBP R&D Strategy – Priority 3.1: Improve mission essential tasks effectiveness for surface border crossings between POEs. Priority 3.5: Improve situational awareness in lightly patrolled or remote areas.

RAPS tests: Oct '13 – Apr '14 **RAMPS tests:** Aug '14 – Sep '15

TRL at Start: 6	TRL at Project Completion: 8

Transition Products

- **RAPS & RAMPS**: Archive of SUAS Test Reports detailing SUAS performance data and DHS utility assessments from flight experiments in land and maritime scenarios respectively
- **Airborne Sensors**: Test Reports and After-Action Reports; technology readiness and cost feasibility assessments; technology roadmaps; integration and transition planning support
- **Moving Target Indicator** (MTI): Extended OT&E Final Report, improved Tactics, Technology, Procedures (TTPs) and CONOPS, integration roadmap for CBP aircraft

TTA Status: TTA with CBP OAM for Moving Target Indicator in draft

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Tunnel Activity Monitoring (TAM)

Project Descriptions

Need: Covert, low power sensors for detection and tracking of illegal activity in public infrastructure storm drains and sewer tunnels. Integrate sensors with communications capability to relay detection info out of the tunnel to a CBP Command Center display.

Approach: Execute a phased implementation of sensor development followed by laboratory and local field testing and then installation at a southern border city. A comms capability will exfiltrate remote sensor detections to the Command Center and provide a display of the intruder's track and potential exit points.

Expected ROI: 24/7 automated, remote, real-time detection and tracking of human activity in drainage tunnels, with a near 100% detection rate and a very low false alarm rate.

CBP Requirement: Section 3.2 of the OBP Strategy - "Improve Mission Essential Tasks Effectiveness for Subterranean Activity"

Pilot Demonstration: Dec 2013- Sep 2014

TRL at Start: 4	**TRL at Project Completion:** 7

Transition Products

- **Pilot System installed in border city (Dec 2013)** - Provide persistent surveillance of drainage tunnel activity, and cue law enforcement real time to the threat's location and track. Exfiltrate detections to the Command Center for display of track and identify potential exit points, based on city GIS maps.

- **Acquisition documentation (Mar 2015)** A package of specifications, costs, and sources/procurement recommendations will be provided for the system infrastructure as well as the installation tasks. This information will facilitate build out of the system in other cities/border locations.

TTA Status: TTA under review with CBP

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Tunnel Detection

Project Descriptions

Problem: The tunnel threat is a serious and growing concern to national security. Tunnels are used to smuggle contraband and illegal immigrants into or out of the United States. This project will develop/adapt relevant technologies and equipment to detect clandestine cross-border tunnels.

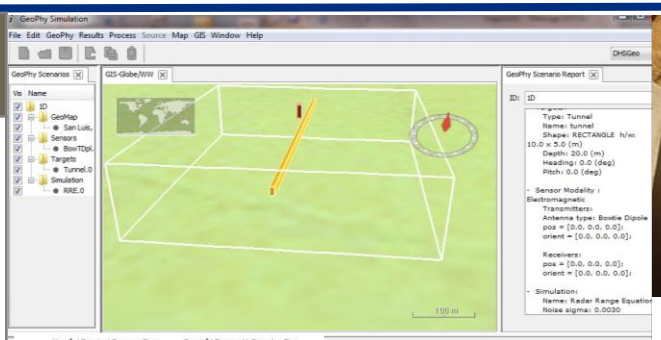
Approach: Survey geophysical characteristics of border areas where probability of tunneling is highest to generate data sets. Develop sensor models to predict performance of most promising sensor technologies using data sets. Identify relevant tunnel features to exploit. Prototype promising technologies, develop/refine algorithms and components, test/operationally evaluate with CBP to validate performance.

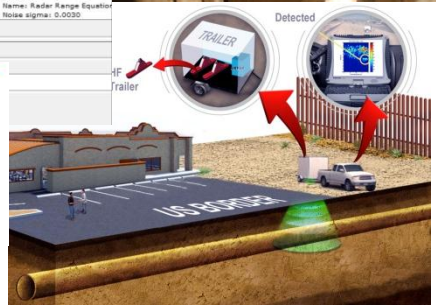
Impact: Expect probability of detection of up to 90% (compared to zero now) with false alarm rates as low as 10%. Estimate annual savings of 7.5 man-years of BP/ICE agent labor ($1.125M), $1M in contract costs (to drill boreholes). Anticipate discovering 10 additional tunnels/year (currently 20 tunnels discovered/yr) and keeping 100's of tons of drugs off US streets.

CBP Requirement: Section 3.2 of the OBP Strategy - "Improve Mission Essential Tasks Effectiveness for Subterranean Activity"

Operational testing and evaluation – Sept 2015 – Apr 2016

TRL at Start: 3	TRL at Project Completion: 6





Transition Products

- Sensor Performance Tool & Guidebook to inform operational components which sensor types work in the various locations and the confidence level using each – Dec 2013
- Developmental Prototype(s) for operational experimentation and to get user feedback - Sept 2014
- Operational Prototype(s) for testing and evaluation – Sept 2015
- Technical Data Package to CBP's Program Office – Dec 2016

Letter of Intention/TTA Status: Signed by BMD & OTIA. IAA with $4.8M sent from OTIA to BMD (signed 5/2012).

Safe Quick Undercarriage Immobilization Device (SQUID)

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Project Descriptions

Problem: There is an officer safety issue of deploying vehicle stopping capabilities in fleeing situations.

Approach: Prototyped under a Small Business Innovative Research (SBIR) project. Provide a portable, remotely operated, vehicle stopping device.

Impact: Minimizes danger to officers, vehicle occupants, and bystanders.

- Weighs < 150 pounds
- Stops a 5,000-pound vehicle within 500 ft.
- 50 mph in off-road conditions / 120 mph on hard surface
- Incapacitate ≥ 30 minutes

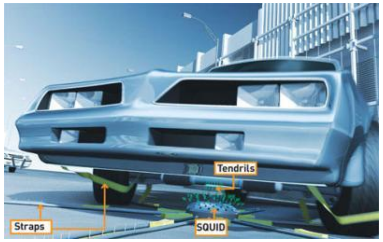
In addition to between Ports of Entry (POEs), when used at POEs, the device removes the need to station an officer in a chase vehicle should a port runner situation occur. This frees up that duty assignment for other high priority areas.

CBP Requirement: Provide a capability that can be operated remotely to stop a fleeing vehicle - motivated by the loss of Border Patrol agent

Prototype Demonstrated– 3Q FY2010

TRL at Start: 4	TRL at Project Completion: 8

NightHawk™



"Drag Net." *Popular Science*. Web. 26 March 2009

Pit-BUL™

Transition Products

- Prototyped under an SBIR.
- Evolved into two commercially available products - Pit-BUL™ (a speed bump encased vehicle arresting device) and NightHawk™ (a portable vehicle arresting device housed in a carry-on luggage size case). Both products are remotely operated.
- CBP bought 5 Pit-BUL™ and 48 NightHawk™ in 2012

Letter of Intention/TTA Status: Transitioned Capability

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Coastal Surveillance System (CSS)

Project Descriptions

Problem: The U.S. has very limited ability to detect, track, and interdict small "dark" vessels that smuggle contraband and illegal immigrants into the US.

Approach: CSS improves the interdiction of small vessel threats using an open, scalable, and flexible architecture that supports re-use across other mission sets. CSS will add/enhance capabilities for persistent surveillance, intel analysis, auto alerting and tasking, integration of new data sources, and overall information sharing at the unclassified level. Lifecycle cost savings are achieved through re-use of services and system components. The same architecture is being used by all DoD JCTD programs that involve information sharing & collaboration.

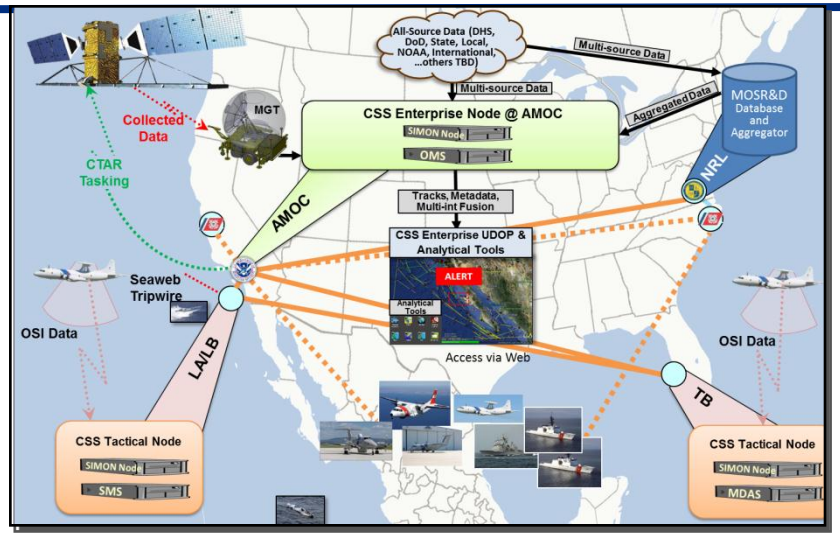
Return on Investment: Capability/efficiency improvements include:

- Enhanced maritime domain awareness
- Increased availability of actionable Law Enforcement information through data aggregation, data fusion, and strategic analysis
- Increased interdiction and prosecution rates while decreasing interdiction costs (through more effective asset tasking and pre-positioning). Our goal is 8X increase in vessel detection and 8X increase in apprehensions.

CBP Requirement: CBP Air and Marine needs the ability to locate and track small vessel threats, target, and coordinate response activities with maritime partners.

CES Pilot at AMOC: Oct 2013 – Oct 2015

TRL at Start: 4	TRL at Project Completion: 8



Transition Products

In April 2016, the following will be transitioned to CBP and USCG, and made available to federal, state, and local law enforcement organizations:

- The CSS "core" - Includes enterprise and tactical nodes with a set of re-usable domain and infrastructure services for agile information sharing and discovery.
- Mission-specific technologies including data fusion engine, new data feeds from underwater acoustic sensors, acoustic buoys, surface radars, overhead imagery and smart phone apps

Letter of Intention/TTA Status: Signed by BMD and CBP on 25 June 2013

Centralized Examination Station (CES) /In-Bond Project

Homeland Security
Science and Technology

Project Descriptions

Problem: Conveyances are currently secured with ISO bolt seals which are easily defeated and have no capability to report a breach. This allows in-bond shipments (intended to transit thru the US w/o customs duties) to be illegally off-loaded without detection. Bolt seals also require manual logging, tracking, and processing at border POEs and CESs.

Solution: Develop a performance standard and certification process for cost effective reusable electronic conveyance security devices (RECONS).

Approach: Publish an notice of intent containing a Draft Performance Specification for RECONS, enter into a CRADA with selected vendors, then conduct lab and operational assessments using candidate RECONS in CES and In-Bond ops.

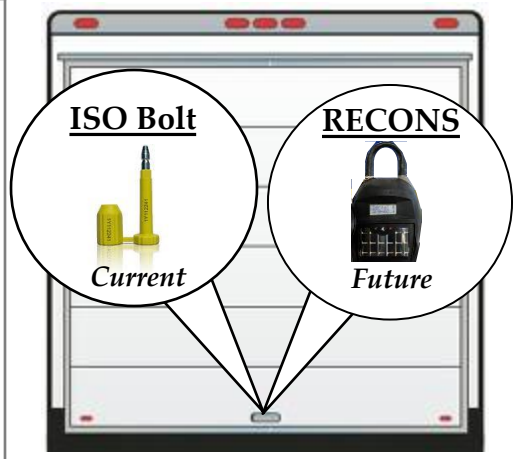
Impact: Use of hard-to-defeat security devices could yield ~$166.5M/year in additional tax revenue (ensuring in-bond cargo is not illegally off-loaded). Automating the now manual bolt seal logging/tracking process could free up 229,000 hours/year of CBP manpower, after an initial one-time investment of less than $10M (based on figures reported in GAO 07-561).

CBP Requirement: CBP Mission Needs Statement for the use of Conveyance Security Devices; and Leveraged Technologies from Apex-Secure Transit Corridors

CES Pilot: Jun-Dec 2014 **In-Bond Pilot**: Aug-Dec 2014

TRL at Start: 6	**TRL at Project Completion:** 7

Conveyance Security



Transition Products

The project will deliver to CBP:

- **Hardware/Software used during operational assessment (Jan 2015)** to include the data mgmt system, RECONS, and any supporting infrastructure.
- **Draft Performance Specification for RECONS (Mar 2015)** proven to allow vendor development of COTS products which are interoperable and certifiable
- **Acquisition documentation (Mar 2015)** for follow-on CBP acquisition and/or sustainment to include an enterprise architecture, certification test plan, and data management system requirements document.

Letter of Intention/TTA Status: Memorandum of Agreement signed by CBP/OFO, OTIA, OT, and OIT

Mid-Energy Scanning System Upgrade

Project Descriptions

Mid-Energy Scanning System Upgrade (MES²U): CBP non-intrusive inspection (NII) systems are reaching the end of their expected 10-year service life. Fielded units range in age from 7.6 years to 10 years. The older units are exhibiting less than optimal performance and maintenance costs for the mechanical portions of the systems continue to climb. CBP is embarking on a life extension effort which will focus on restoring and/or upgrading the mechanical portions of vehicle (mobile systems) and platform (fixed systems). CBP has asked BMD to develop software and limited hardware upgrades, in field installation kits which will enhance and sustain these legacy units by infusing state-of-the-art detection technology.

ROI: CBP has neither the acquisition, nor O&M funds with which to purchase new, high-energy units (~$3.5M) and maintain them (~$500K/unit/year). Best estimates indicate that an upgrade kit, following development ($2.5M), can be produced for <$500K each. This eliminates need for procurement and continues annual maintenance costs at <$100K/unit/year.

CBP Requirement: Non Intrusive Inspection (NII) technologies are a force multiplier and the current system capabilities continue to degrade with age.

Operational testing and evaluation: Feb – Nov 2015

TRL at Start: 4	TRL at Project Completion: 8

Mobile Scanning System
71 units

Rail Scanning System
26 units

Other Units
Portal Scanning Systems
Pallet Scanning Systems

Transition Products

- Field tested prototype (Feb 2016)
- Acquisition support documentation (Aug 2016)
  - Results of analyses & modeling
  - Design and Interface Drawings
  - Performance specification(s)

TTA Status: TTA with CBP OFO/LSS in draft (Acquisition Plan also in draft)

Homeland Security
Science and Technology

Pollen Forensics

Project Descriptions

Problem: CBP is solely dependent on commercial laboratory to process pollen samples for enforcement of trade compliance. Not only is this expensive, it induces a large time delay that results in lost opportunities to enforce trade law/collect customs revenue.

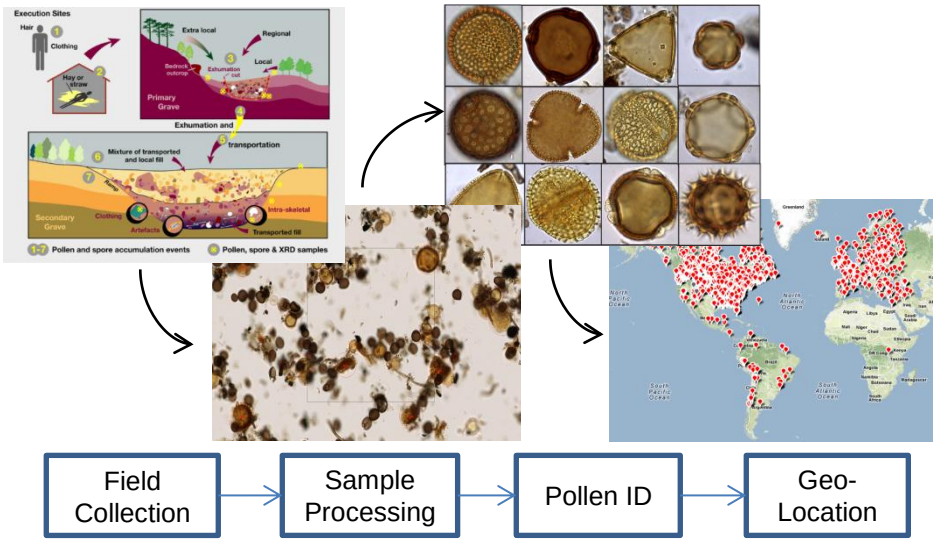
Approach: An effective in-house CBP pollen identification and geo-location capability will enable rapid, more comprehensive, cost effective cargo screening. This capability will be used by CBP to determine trade compliance, country of origin and provide evidence for criminal investigations.

Impact: In 2010 CBP spent $7.56M outsourcing pollen sample processing. In house processing is expected to reduce this cost by half (from $4K to $2K/sample. Costs to staff and outfit 8 CBP LSS labs to process pollen samples is estimated to be $3.99M. Recovery of the staff/lab investment will be approx 2 years, not considering the dramatic increase in opportunity to enforce trade law/collect customs revenue.

CBP Requirement: OBP R&D Strategy 3.6.4 - Enhance identification and classification technology for contraband. Faster, more reliable identification and classification processes are needed.

Transition System to CBP – Sept 2015

TRL at Start: 4	TRL at Project Completion: 7



Transition Products

Transitions to CBP LSS include:

- Improved Sample Collection and Sample Processing Methods
- Combined Pollen ID and Geo-location Database for Areas of Interest (Sept 2014)
- Complete In-House System with Final databases, standardized methods, and a laboratory equipment list (Sept 2015)

Letter of Intention/TTA Status: LOI w/CBP LSS signed on 6/14/2012

Apex Air Entry/Exit Re-Engineering

Project Descriptions

Problem:

- Current Air Entry processes at US International Airports at capacity. Projected 4% increase in passenger volume per year plus new/expanded services expected to strain CBP resources.
- No Biometric Exit Process.

Solution: Establish CBP/S&T partnership to develop recommended approaches, test and implement technologies for cost-effective and integrated biometric capabilities.

Approach:

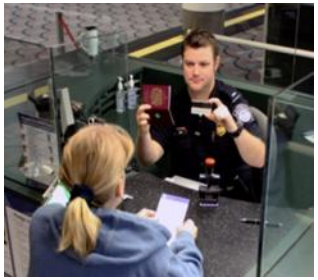
- Execute Air Entry/Exit Operational Survey
- Engage Stakeholders
- Identify FIS Operational Requirements & Capability Gaps
- Establish Biometric Test Bed for scenario testing
- Technology Foraging and Qualification
- Solution Development, Testing and Evaluation
- Transition Solutions to Operators

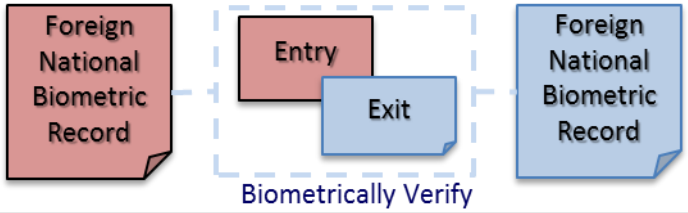
Impact: Provide CBP ability to biometrically verify in-scope travelers have left the US and support increased passenger volumes.

CBP Requirement: Biometrically verify the foreign national who exits the United States is the same foreign national who entered the United States

Test Bed: 4/2014 – 5/2015 **Field Trial**: 1st QTR FY16

TRL at Start: 6	TRL at Project Completion: 7





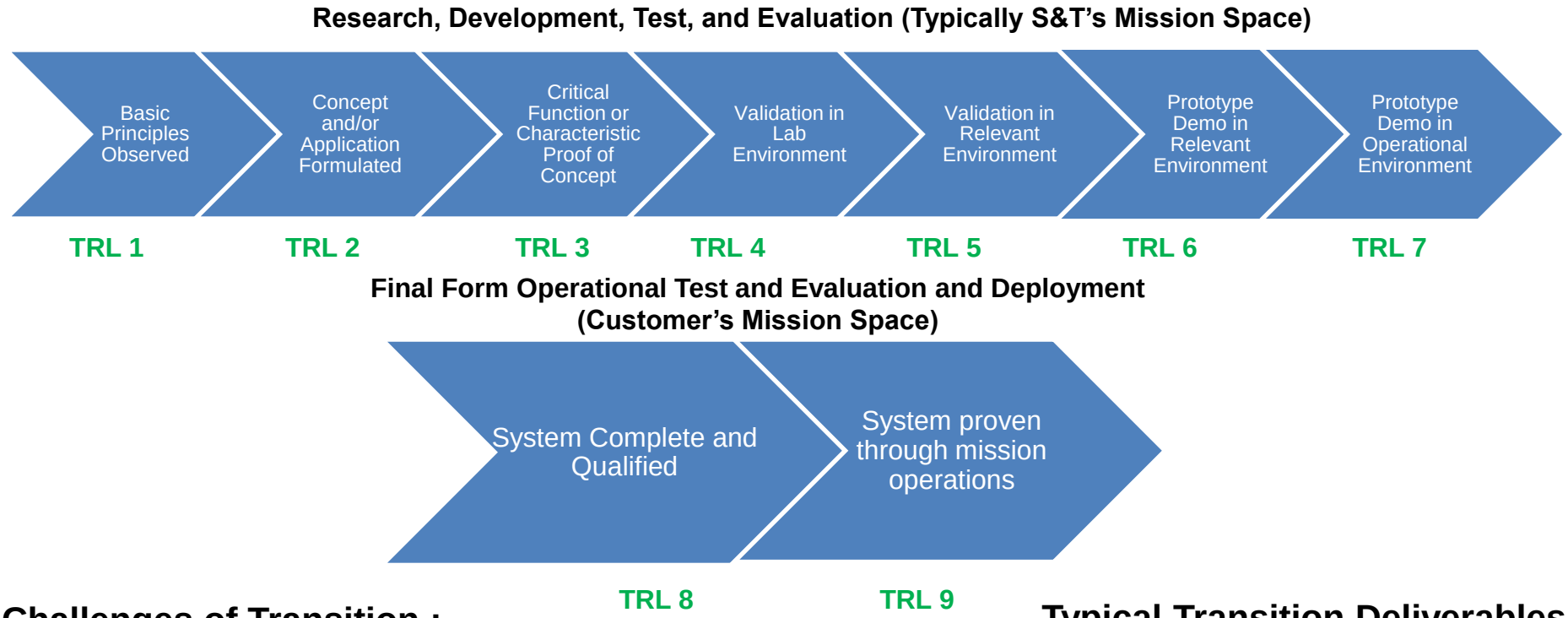
Transition Products

The project will deliver to CBP:

- **Biometric Capability (1 QTR FY16)** - Cost-effective, integrated Air Biometric Entry-Exit Concepts of Operations and technologies.
- **Federal Inspection Service (FIS) Model Toolkit (2nd QTR FY14) -** Capability to analyze and evaluate both process and technology solutions.
- **Business Case (4th QTR FY15)** – Documentation for follow-on CBP acquisition and/or sustainment to include Business Case Analysis and foundational acquisition documentation.

Agreement: Project Charter signed by DHS S&T and CBP March 2013

Technology Readiness Levels and Transition



Challenges of Transition :

- Volatile Out-Year Funding Availability
- Change in Customer Priorities
- New System Deployment Vs. Upgrades of Current Capability
- Customer Readiness
- Acquisition Documentation/Program of Record Establishment
- Commercial Industry Acceptance

Typical Transition Deliverables:

- Knowledge Products
- Prototypes
- Performance Specifications
- Final Form Systems
- Industry Standards
- Acquisition Documentation
- Contract Vehicles
- Commercialized Products

Department of Homeland Security
Science & Technology

HSSTAC -- FRG & CBP

Joseph "Jay" Martin
Deputy Director, FRG
Science & Technology Directorate

December 5, 2013

Homeland Security

Homeland Security
Science and Technology

DHS Science and Technology Mission



To strengthen America's security and resilience by providing knowledge products and innovative technology solutions to the Homeland Security Enterprise



Homeland Security
Science and Technology

FRG's Strategic Focus Areas

Communications

Data Gathering/Sharing

Responder Safety & Effectiveness

Radiological/Nuclear Response & Recovery

Communications

Wireless Broadband Technology Demonstrator

Problem DHS needs to identify solutions for upgrading its existing land mobile radio systems with wireless broadband capabilities

Solution An enterprise-wide initiative, led by S&T and CBP, to explore solutions in four technical areas:

- ❑ Mission Critical Voice (MCV) over broadband
- ❑ Video and data to tactical user devices
- ❑ Remote Management, and
- ❑ Network Integration

Communications

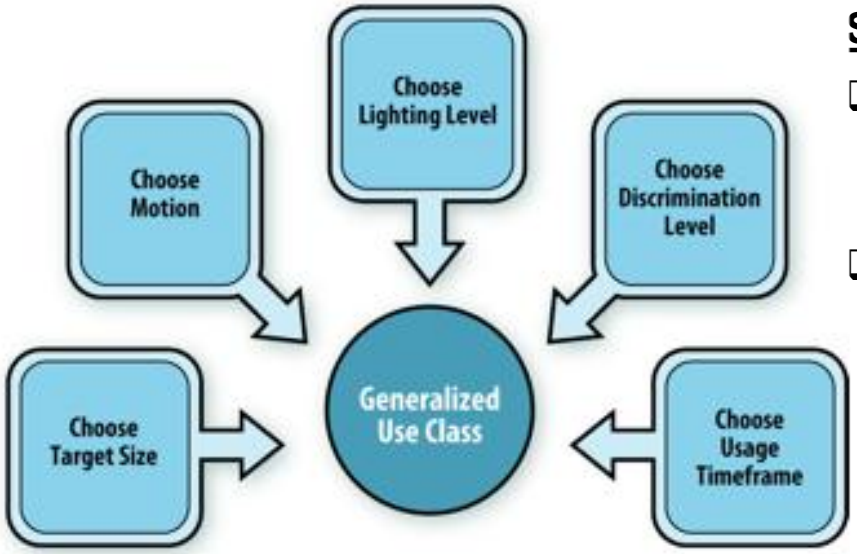
Wireless Broadband Technology Demonstrator

Three Avenues of Exploration

- ❑ Use current DHS CBP radios and enable users to switch between LMR and Broadband networks at the touch of a button
- ❑ Attach a smartphone jacket to host and leverage existing Land Mobile Radio (LMR) infrastructure, giving users both broadband capabilities and the LMR capabilities needed for mission critical voice
- ❑ Use Commercial Off the Shelf COTS) products that can be dual-purposed to include LMR interfaces and Public Safety Broadband applications

Data Gathering/Sharing

Video Quality in Public Safety (VQiPS)



Problem Public safety agencies lack information and resources to identify video technology most suitable for their missions

Solution Provide information and technical support so agencies can assess video requirements and make appropriate procurement decisions

S&T's Approach

- ❑ Team with the US Department of Commerce Public Safety Communications Research program
- ❑ Developed:
  - ➢ Video Quality Standards handbook
  - ➢ Four technical reports on video quality tests and requirements
  - ➢ Defining Video Quality Requirements: A Web Tool for Public Safety

http://www.pscr.gov/projects/video_quality/video_about.php

Homeland Security
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Data Gathering/Sharing

Low Light IP-based Surveillance Camera

High-definition, extreme low-light, internet protocol (IP)–based video camera that receives control signals and transmits compressed HD video real-time over WiFi or LTE networks

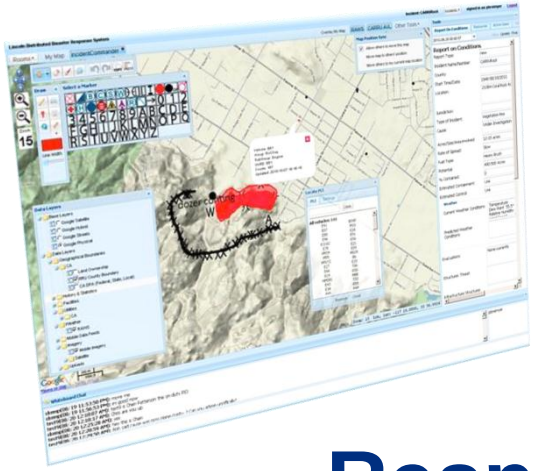
Mobile Biometrics

Mobile biometric device capable of fingerprinting, facial recognition, iris scanning; captures latent fingerprints, using near infrared camera; wirelessly transmits queries to governmental databases

Finding Individuals for Disaster and Emergency Response (FINDER)

Low-power microwave radar detects breathing and heartbeat movements through several meters of rubble; ideal for search and rescue; can help law enforcement detect concealed persons in buildings, behind walls, and in vehicles

Data Gathering/Sharing



Next-Generation Incident Command System (NICS)

A simple-to-use, web-based interface that collects data from varied sources and provides situational awareness in a collaborative environmen.

Responder Safety and Effectiveness

Virtual Training

Web-based interactive video training enables responders from multiple disciplines and jurisdictions to collaborate in realistic scenarios, 24 / 7/ 365

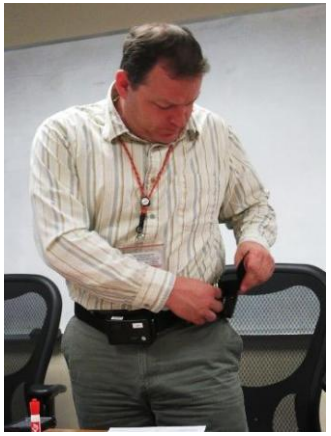
Support for State and Local Bomb Squads

A systems analysis-based program identifies and prioritizes bomb squad requirements and directs RDT&E of needed technologies; involves countermeasures experts from all levels of government

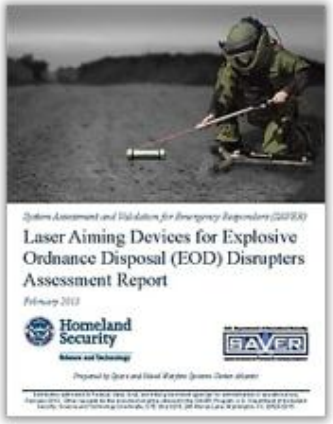
Responder Safety and Effectiveness

Firefighter Accountability and Proximity Device

Small, portable device transmits ranging signals to a base station, enabling rescuers to locate a firefighter in distress in a GPS-denied environment



System Assessment and Validation for Emergency Responders (SAVER)



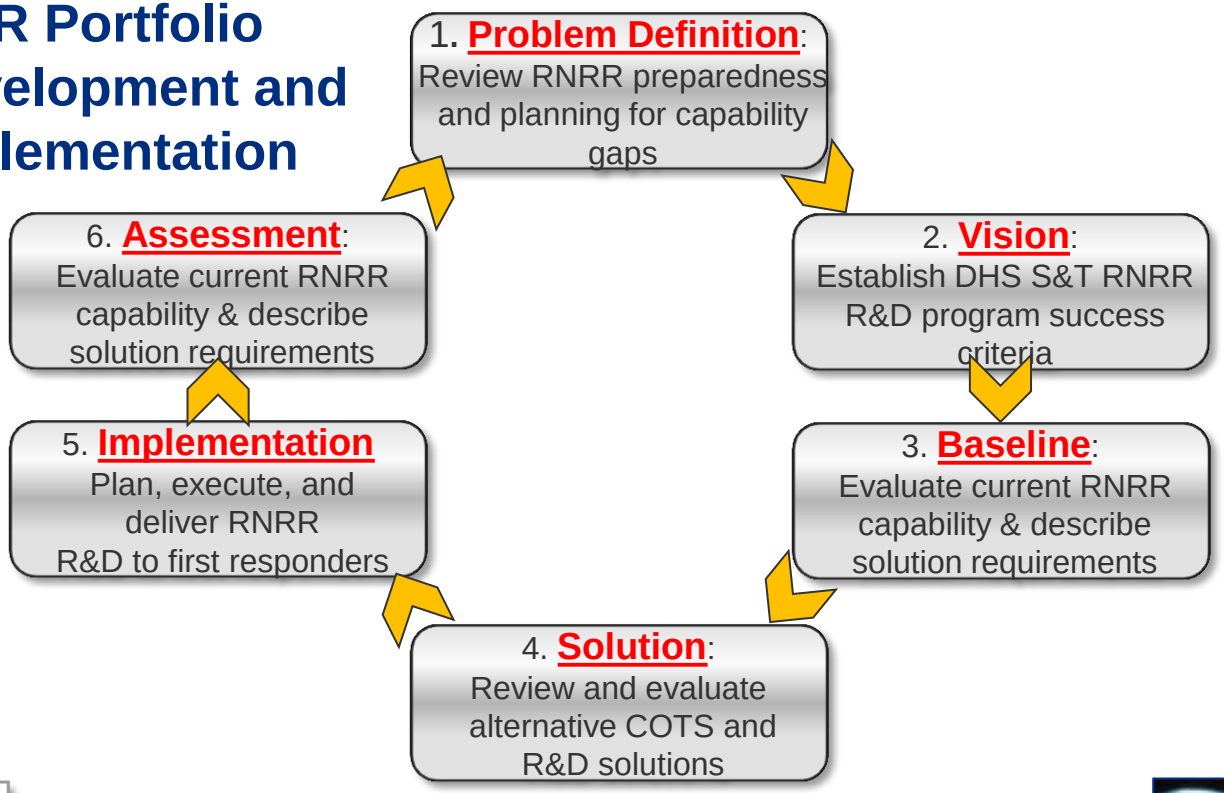
Conducts impartial operational assessments of emergency responder equipment and issues reports that guide responders in selecting, procuring, using, and maintaining equipment

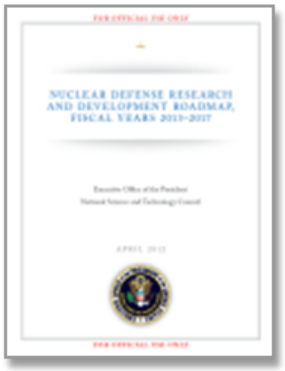
Integrated Responder System

Integrated system provides routine multi-hazard protection, integrated electronics, improved voice and data communications, and advanced sensors and information technology

Radiological/Nuclear Response and Recovery

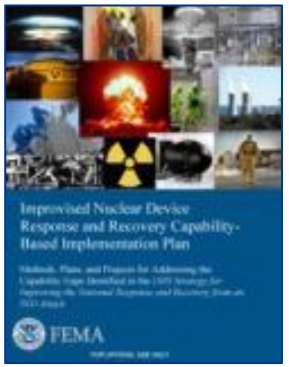
RNRR Portfolio Development and Implementation





Nuclear Defense R&D Roadmap: Priorities across the federal government

FEMA Capability-Based Implementation Plan



Radiological/Nuclear Response and Recovery

Radiological Emergency Management System (REMS)

Network of rooftop gamma radiation sensors gives emergency managers:

- Picture of the threat in the earliest moments of the incident
- Critical information about radiation levels before responders enter affected area
- Guidance on which areas to evacuate and which to shelter in-place
- Information about potential radiation exposure, which can reduce public panic and avoid unnecessary evacuations
- Data for computer models to predict path of the radioactive plume
- Sensors throughout NYC monitored at the Lower Manhattan Security Initiative command and control center

Department of Homeland Security
Science & Technology

HSSTAC -- ASOA &CBP

Ms. Debra Durham
Director, ASOA
Science & Technology Directorate

December 5, 2013

Homeland Security

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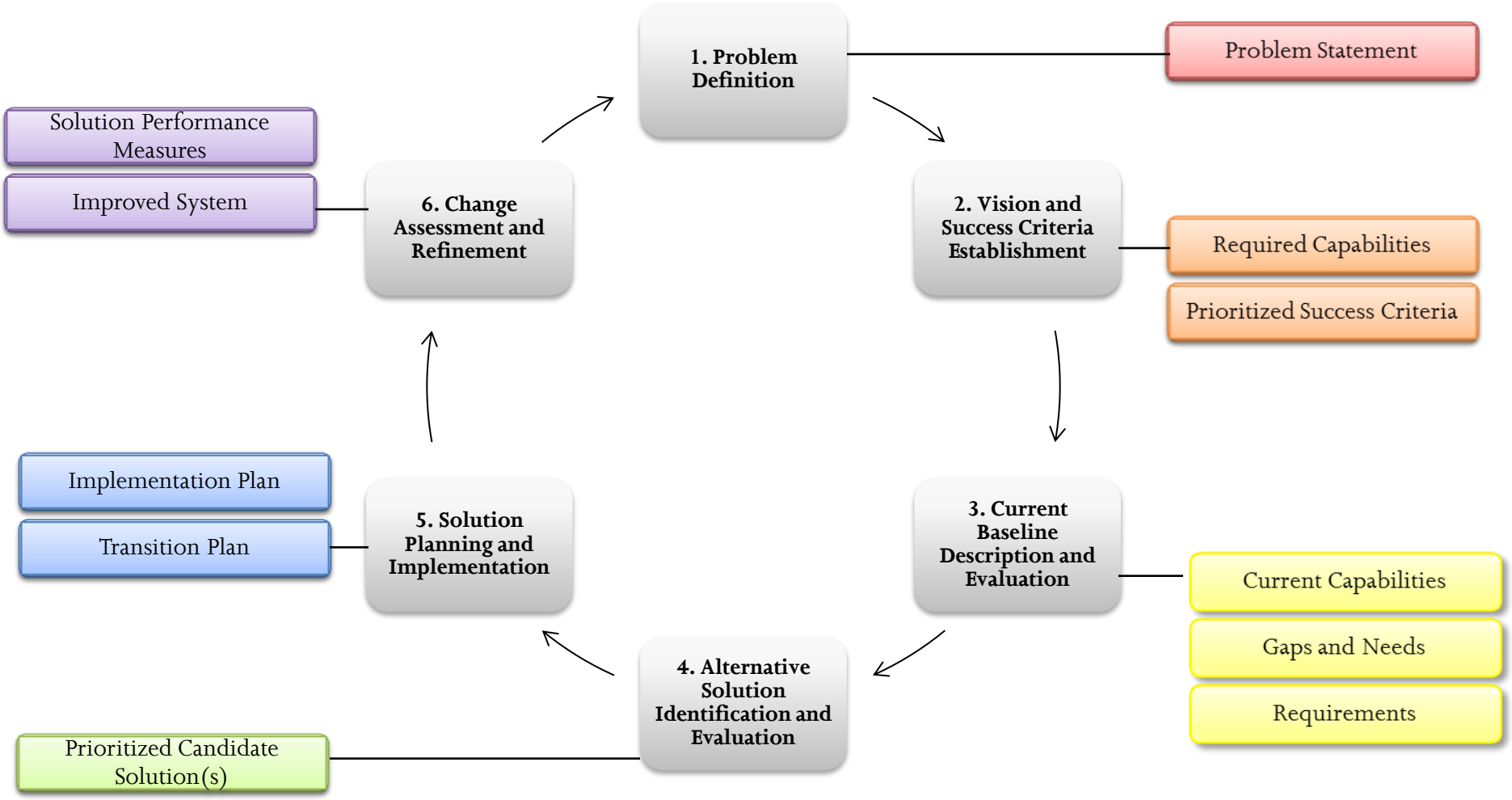
Systems Analysis Deliverables



Our focus is on listening to and helping the Operator address their challenges while staying connected to Corporate strategy, needs and requirements

Homeland Security
Science and Technology

Rio Grande Valley (RGV) Systems Analysis

- **Overview: McAllen Station (MCS) and Rio Grande City (RGC) Station effort to qualify and quantify operational needs and requirements**
  - **S&T Funding: $524K**
- **Major Accomplishments:**
  - **Conducted Tabletop Exercise at MCS utilizing MCS and RGC agents to execute two distinct scenarios**
    - **Documented 22 areas categorized into four functional categories for potential solutions**
  - **Assessed McAllen Station alien intake process and recommended improvements:**
    - **Potential to streamline alien intake process as much as 81%**
    - **Would require mix of process and capital investments**

Project Sequence

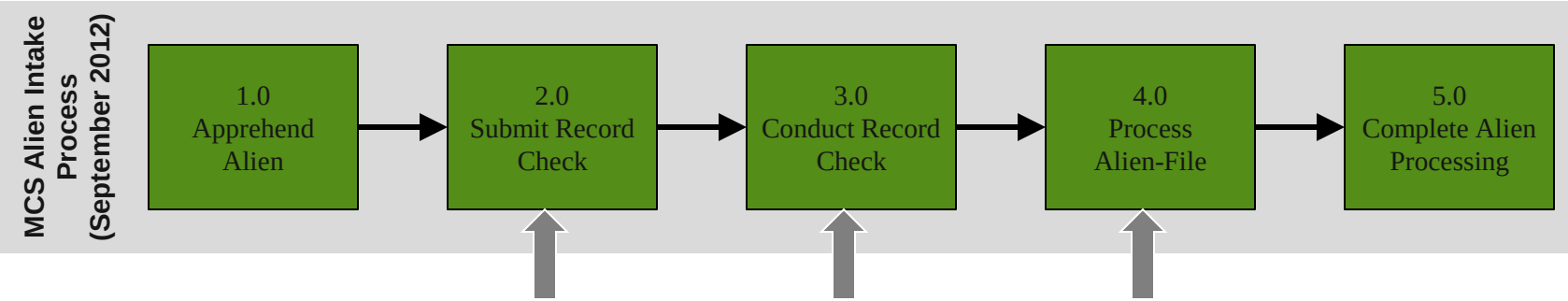
1. **Problem parsing and definition**
   - **Mission, objectives, scenarios**
2. **Articulation of current Concept of Operations (CONOPS)**
   - **Agent roles**
   - **Environment and constraints**
   - **Technological tools**
3. **Assess potential technology solutions, impacts on CONOPS**
   - **Understand "art-of-possible"**
   - **Filter, synthesize approaches**
   - **Consider COTS, GOTS, State-of-the-art**
4. **Synthesize solution options and provide guidance to potential Analyses of Alternatives (AoA) and acquisition/procurement decisions**

---

5. **Solution development, technology assessment, transition, and implementation**

Assessed potential changes and impact on MCS Alien Intake Process

- Assessed McAllen Station Alien Intake Process (June-September 2012) *
  - Used Lean Six Sigma approach, paired with the Kaizen methodology and business improvement techniques to identify areas of maximum improvement



Type	Alien Intake Process Improvement Recommendations
Business Process Reform	Change staffing/workload assignments A. Redeploy civilian and law enforcement staff to field and operational roles B. Replace Border Patrol Agents and Sector Enforcement Specialists (SES) with civilians to perform processing functions, freeing SES to provide operational support C. Deploy Dedicated Processing Agents to all 3 shifts to oversee and ensure that all activities related to law, rule or regulation are carried out D. Redirect Other Than Mexican (OTM) Juveniles – Upon arrival at MCS Sally Port, immediately transport all OTM juveniles to Ft. Brown Station for processing
Business Process Reform	Streamline documentation and approvals of reports and Forms
Business Process Reform	Reconcile/Refresh SOP/Policy Alignment and Approvals for Changes
Business Process Reform	Establish Performance Measures and Key Performance Indicators (KPI)
Capital Investment	Optimize support Tools
Capital Investment	Re-define logistics/physical Layout

- If all process improvements are fully implemented at MCS, it's possible to re-deploy ***Up to 81% of agents and About 67% of Sector Enforcement Specialists***

* Assessment did not include external processes such as alien health checks conducted at local hospitals

CBP-ICE Alien Processing Systems Analysis

- **Six-month pilot effort to identify CBP/USBP and ICE/ERO alien processing efficiencies along the South Texas Border**
  - **Characterizes, maps, and measures current CBP/USBP alien detention process and ICE/ERO Civil Immigration Enforcement Core Process**
  - **Highlights data, communications, and alien custody transfer points between CBP/USBP and ICE/ERO**
  - **Leverages the results of a previous RGV Systems Analysis Project to expedite completing the task**

CBP/USBP

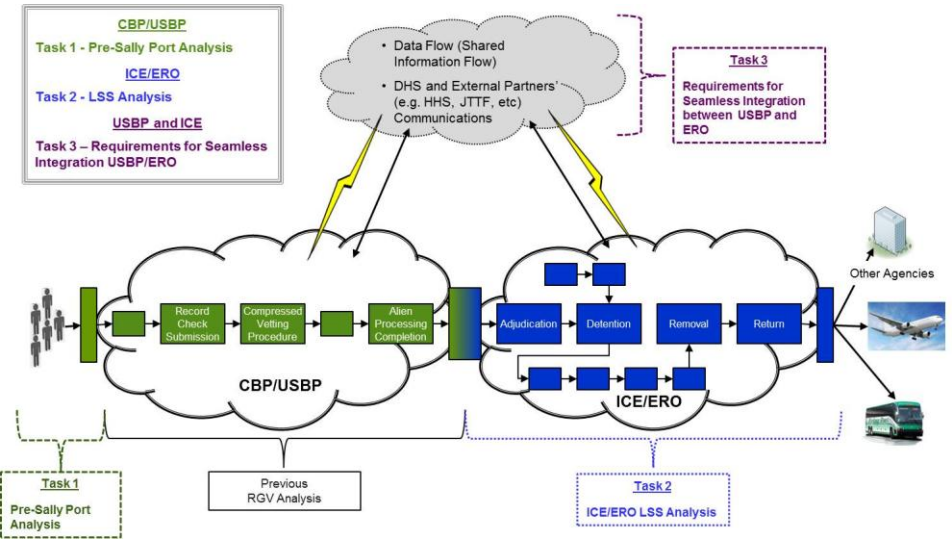
Task 1 - Pre-Sally Port Analysis

ICE/ERO

Task 2 - LSS Analysis

CBP/USBP and ICE/ERO

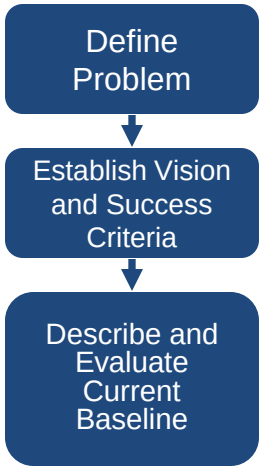
Task 3 – Requirements for Seamless Integration between CBP/USBP and ICE/ERO



Goal is to demonstrate a repeatable systems process that can be successfully applied to this and other problems faced by CBP

Project Methodology, Key Analytic Techniques, Assumptions

❑ Project Team will utilize the S&T Systems Analysis Process to:



- **Define CBP-validated and ICE-validated operational alien processing challenges/problems**
- **Develop CBP-validated and ICE-validated vision and success criteria for the ideal process for alien custody transfer between CBP/USBP and ICE/ERO**
- **Describe and compare current CBP/USBP alien detention process and ICE/ERO Civil Immigration Enforcement Core Process with ideal processes**
- **Determine what is required to enhance alien custody transfer between CBP/USBP and ICE/ERO**

Analytic Techniques

Mission Analysis	Stakeholder Analysis	Requirements Analysis
Gap Analysis	Process Flow Analysis	Needs Analysis

Project Assumptions

Project activities will not impact day-to-day CBP/USBP operations	CBP/USBP SMEs will be available for interviews and routine interaction
Activities focused on leveraging existing (or near-term) technologies to deliver achievable results with measurable impact	Current CBP/USBP process descriptions, database descriptions, applicable TTPs will be provided

Identified Potential Areas of Interest

CBP	ICE
Working Groups held 30 May and 20 June	Follow up meeting held on 5 July and provided artifacts (Trip Report, Transportation AoA SOW, Process Maps)

Identified Potential Areas of Interest

CBP	ICE
▪ Seamless integration b/n CBP/USBP and ICE/ERO – Physical transfer – Communications – Data Flow (Shared info flow)	▪ Identify Business Process Efficiencies – "Right Sizing" ICE/ERO processing staff – Transportation scheduling/utilization – Lean Six Sigma Analysis
▪ "Going Paperless"	▪ Cost Benefit Analysis for identified efficiencies
▪ Integrated Technology Road Map (Foliage Penetration)	
▪ End to end process analysis (alien encounter through custody transfer)	▪ End to end process analysis (alien encounter through return to country of origin)

Homeland Security
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Conceptual Operational Visualization of the End-to-End Alien Processing

CBP/USBP

Task 1 - Pre-Sally Port Analysis

ICE/ERO

Task 2 - LSS Analysis

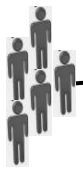
CBP/USBP and ICE

Task 3 – Requirements for Seamless Integration USBP/ERO

- Data Flow (Shared Information Flow)
- DHS and External Partners' (e.g. HHS, JTTF, etc) Communications

Task 3

Requirements for Seamless Integration between USBP and ERO



Record Check Submission

Compressed Vetting Procedure

Alien Processing Completion

CBP/USBP

Adjudication

Detention

Removal

Return

ICE/ERO

Other Agencies

Task 1

Pre-Sally Port Analysis

Previous RGV Analysis

Task 2

ICE/ERO LSS Analysis

Homeland Security
Science and Technology

OTE Oversight of CBP's Major Acquisition Programs

Program Name	ACQ Level	Description/ACQ Phase
Facilities Management & Engineering Tactical Infrastructure (FM&E TI)	1 (Non-IT)	FM&E TI helps to address the capability gap of maintaining and repairing the facilities along our nation's borders. This includes units totaling 701 miles of tactical infrastructure. Acquisition Phase: Produce/Deploy/Support
Automated Commercial Environment	1 (IT)	ACE fills the capability gap to interact, manage, and oversee the import and export data, custodial revenue management, and enforcement systems in order to provide end-to-end visibility of the entire trade cycle. The ACE PMO has been directed to provide a prioritized list of discrete elements of capability with associated schedules. Acquisition Phase: Obtain
TECS Modernization	1 (IT)	TECS Mod addresses a capability gap by improving the technological and data sharing functions at and between the Ports of Entry (POEs) and improving Primary and Secondary Inspection processes at border POEs. TECS Mod will incrementally develop and deploy this modernization effort. Acquisition Phase: Mixed Lifecycle
Tactical Communications Modernization	2 (IT)	TAC-COM addresses a capability gap by improving coverage, capacity, reliability, and encryption, the modernization effort provides critical communications support to the agents and officers who secure the nation's borders. Acquisition Phase: Obtain
Non-Intrusive Inspection Systems Program (NII)	1 (IT)	The NII Systems Program addresses a capability gap as it supports CBP's interdiction and security efforts by providing technologies that help CBP officers and agents examine a large volume of traffic safely, quickly and effectively to detect a wide range of contraband that is imported using a variety of conveyances. Acquisition Phase: Produce/Deploy/Support

Homeland Security
Science and Technology

OTE Oversight of CBP's Major Acquisition Programs (cont'd)

Program Name	ACQ Level	Description/ACQ Phase
Integrated Fixed Tower	1 (Non-IT)	This investment addresses a capability gap by specifically addressing the land-based aspects of securing the border in the following six Arizona Stations Areas of Responsibility. Acquisition Phase: Analyze and Select
Strategic Air and Marine Program (STAMP) - Multi-role Enforcement Aircraft (MEA)	1 (Non-IT)	The MEA program provides a modernized aircraft to support air patrol and other CBP missions along the border. Acquisition Phase: Analyze and Select
Cross Border Tunnel Threat	2 (Mixed IT/Non-IT)	The CBTT project will strengthen border security effectiveness between ports of entry by diminishing the ability of Transnational Organized Crime Networks to gain unobtrusive access into the United States through cross-border tunnels and the illicit use of Underground Municipal Infrastructure. Acquisition Phase: Need
Land Border Initiative (LBI)	1 (IT)	LBI addresses a capability gap by providing advanced information, streamlining documentation requirements, assembling comprehensive travel histories and enhancing intelligence and targeting rules. Acquisition Phase: Obtain
Next Generation Tactical Broadband	1 (IT)	Land Mobile Radio systems (See TACCOM Program) in use in CBP cover a variety of technology platforms. Bringing the enterprise to a common digital platform will simplify and improve operations, training, interoperability between sectors, and systems sustainment, as well as allowing for a Radio Over IP platform that will pave the way for interoperability solutions along and across the borders. Reliability and Availability. CBP requires high reliability and availability of LMR systems. Existing analog hardware has been in service since the late eighties and is failing at an increasing rate resulting in more downtime. Acquisition Phase: Analyze /Select

Department of Homeland Security
Science & Technology

HSSTAC -- RDP & CBP

Dr. Keith Holtermann
Director, RDP
Science & Technology Directorate

December 5, 2013

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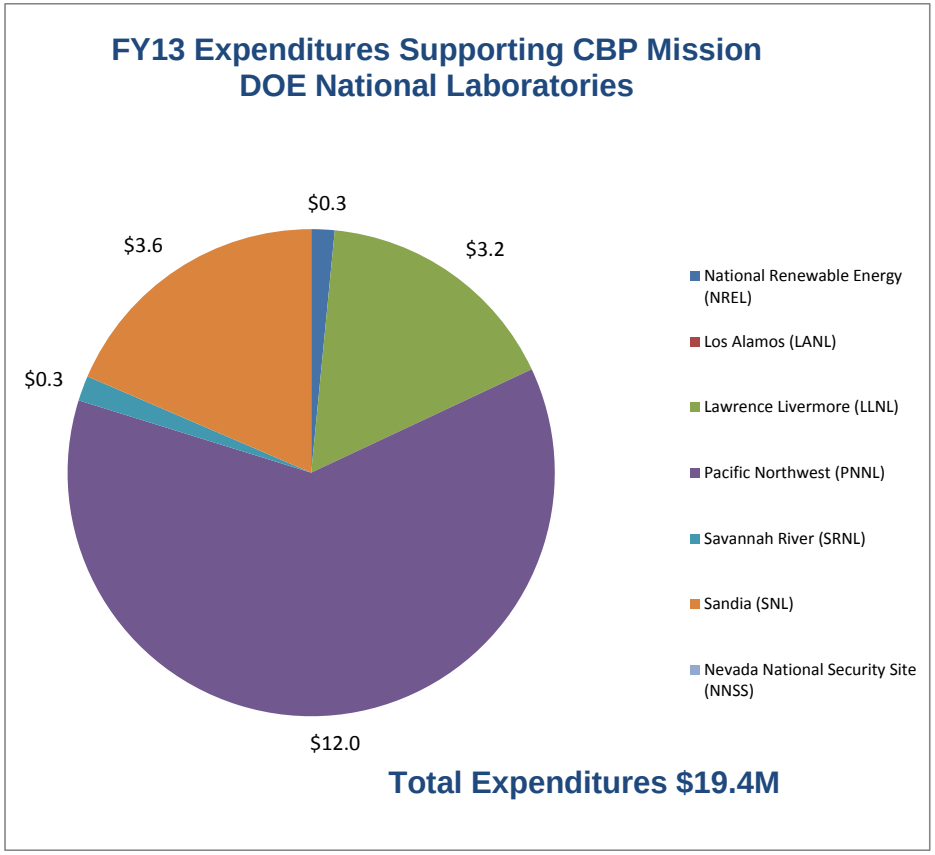
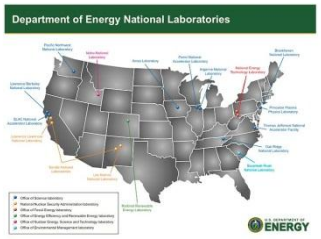
Office of National Laboratories - Summary



- **The DOE laboratories provide CBP full spectrum support that spans:**
  - High Performance Computing
  - Modeling and Simulation
  - Data and Visual Analytics
  - Imaging Technologies
  - Sensor Technologies
  - Tunnel Detection Technologies
  - Cargo Security and Tracking Technologies
  - Radiation Detection Technologies
  - Detection Algorithms for Rad/Nuc Scanning
  - Bio Security and Bio Forensic Technologies
  - Operations Analysis
  - Training, Real Time and Virtual
  - Test and Evaluation



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Office of National Laboratories – Case Studies

❑ Enhanced Radiological Nuclear Inspection and Evaluation (ERNIE)

- **Provider:** Lawrence Livermore National Laboratory (LLNL)
- **Objectives:**
  - Provide comprehensive analysis of data measured by existing RPMs
  - Identify radiation alarms typically released by CBP officers
  - Simplify and accelerate radiation alarm analysis
- **Overall project goals:**
  - Reduce alarm frequency and secondary inspection rates
  - Increase threat sensitivity

❑ Sustainment of Current Domestic Radiation Portal Monitor Architecture

- **Provider:** Pacific Northwest National Laboratory (PNNL)
- **Objectives:**
  - Analyze the anticipated life cycle for an RPM, proposing sustainment strategies to extend their life cycle and understand the associated costs.
  - Provide expertise to CBP's Enforcement Technology Program (ETP) as needed regarding preventive maintenance, repairs, and improvements to ensure installed systems remain fully operational
  - Calibrate systems annually to prevent long-term drift/degradation, minimizing the effects of the recalibration process on port operations
  - Assist ETP in sustaining fully transitioned RPM equipment and related systems
- **Overall project goals:**
  - A sustainment strategy that provides maintenance of the current architecture, upgrades for improved performance, controls costs, eventual replacement of aged systems, and maintains configuration commonality

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Office of University Programs - Summary

- **OUP provides *streamlined* access to the Nation's colleges and universities to address pressing homeland security needs**
- **Budget**
  - From FY09 to FY14, OUP invested about $30 million border and maritime security research and education
- **The COEs offer a variety of capabilities to CBP in the areas of:**
  - Improving the localization and tracking of vehicles, cargo and persons
  - Creating future border screening technologies
  - Evaluating performance metrics and community impacts for OBP checkpoints
  - Economic modeling of POE operations
  - Predictive modeling and simulation
  - Operations research analysis
  - Surveys of unauthorized immigrants post-apprehension to determine motivation and intent
  - Assessing CBP Consequence Delivery Programs

Homeland Security
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Office of University Programs - Case Studies

- **National Center for Risk & Economic Analysis of Terrorism Events (CREATE)**
  - Evaluating the Impact on the US Economy of Changes in Wait Times at Ports of Entry
    - Analysis concluded that adding one CBP Officer at an airport or land port of entry would inject $2 million into the U.S. economy and produce 33 new jobs
- **National Center for Border Security and Immigration (NCBSI)**
  - Assessing the Effectiveness of Traffic Checkpoint Operations
    - Assisted OBP in response to GAO Report. Developed checkpoint data collection protocol, metrics for checkpoint effectiveness and community impacts, and an operational tool for resource allocations, operational planning, intelligence gathering and trend analysis.
  - Identifying sources and impacts of cross-border human trafficking (multiple projects pending)
- **Joint COE Effort: CREATE, NCBSI, and Center for Visualization and Data Analytics (CVADA)**
  - Unaccompanied Alien Children (UAC) Project
    - The goal of this interdisciplinary project is to recommend new process enhancements to gain efficiencies in cost or performance for all responsible parties: CBP, ICE, and HHS

Homeland Security
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Office of Public-Private Partnerships - Summary

❑ Projects

- ➢ Technology Foraging Research Projects
  - Narcotics Destruction for CBP captured contraband
  - Enhanced Cargo Security Locks research
- ➢ Commercialization Office Engagements
  - Working with the Office of Technology Innovation and Acquisition (OTIA), for example the Border Security Technology Consortium
- ➢ Long Range Broad Agency Announcement
  - Topic areas related to Land Border Security and Maritime Border Security included in the solicitation as requested by HSARPA program managers
- ➢ Small Business Innovation Research Program Solicitations
  - Periodically includes topics related to Border and Maritime Security, as submitted by HSARPA program managers in response to CBP and USCG needs

Homeland Security
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SAFETY Act Approvals Supporting CBP Programs/Operations

- October 30, 2013 - The Dow Chemical Company, Rohm and Haas, Union Carbide Corporation, and Dow AgroSciences LLC provide Rail Transportation Security Services.
- September 17, 2013 - Science Applications International Corporation provides the Radiation Portal Monitor System ("AT-980 System") used by CBP officers.
- March 08, 2013 - AtHoc, Inc. provides IWSAlerts, a network-centric mass notification and emergency communications system employed by CBP.
- August 31, 2012 - International Business Machines ("IBM") provides Global Name Management software used for name searching and identity verification by CBP.
- August 16, 2012 - The IBM Corporation provides the Automated Commercial Environment ("ACE") software and support for systems used by CBP for supply chain security.
- May 14, 2012 - Unisys Corporation provides to CBP's Targeting & Analysis Systems Program Office ("TASPO") Support Services for Selectivity and Targeting Systems Software Applications.
- November 04, 2011 - Accenture, LLP provides Virtual Border Management Support Services for the US-VISIT Program.

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Interagency Support to CBP

- **Through the DHS-DoD Capability Development Working Group**
  - Facilitated transfer process of excess equipment from DoD to DHS for CBP
    - Example: Tethered Aerostat Radar System (TARS)
  - Coordinated CBP concerns connected with the Air Domain Awareness Initiative
- **Interagency Office Operational Experimentation Program**
  - Technology Experimentation Events Based on Customer Needs
    - Joint Interagency Field Exploration
    - Technical Support and Operational Analysis
    - Technical Experimentation